## Environmental Impacts of Hurricane Mitch

In 1998, the Caribbean region endured the worst hurricane season in modern history. In October Hurricane Mitch, the most devastating storm to strike Central America, killed an estimated 9,600 people—more people than any Atlantic tropical cyclone since 1780—and spawned a medical and environmental catastrophe. In the weeks following the storm, health authorities were deeply concerned about emerging epidemics of infectious diseases. Gastrointestinal and respiratory illnesses were rampant, especially among children. Thousands lacked access to medical care, 1 million people were homeless, and water supplies were contaminated by floods. In overcrowded shelters, hygiene was poor and food supplies were low.

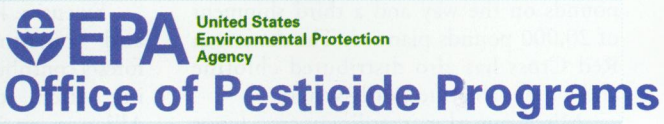
Mitch produced enormous downpours across the region, in nations including Nicaragua, Guatemala, El Salvador, and Belize. More than two feet of rain fell in the mountains of Honduras in a single day, and an estimated six feet of rain over seven days swamped some agricultural areas, drowning crops. "Six feet of rainfall over such a brief period is unprecedented," says Paul Epstein, associate director of Harvard Medical School's Center for Health and the Global Environment.

Health authorities in Guatemala, Nicaragua, and Honduras have reported clusters of diseases such as dengue fever, hemorrhagic dengue fever, and malaria, which are spread by mosquitoes; leptospirosis, which is linked to contamination by rat urine; and cholera, which can spread through polluted drinking water and contaminated food. Until recently, it was very uncommon to see such multiple outbreaks of infections, Epstein says. But over the past decade, there has been an increase in clusters of such illnesses in numerous regions around the world following heavy, prolonged rains.

According to a November 30 report of the Pan American Health Organization's (PAHO) emergency task force on Hurricane Mitch, in Honduras there have been 16 confirmed cases of cholera, 1,908 cases of malaria, 6 cases of leptospirosis, 1,165 cases of dengue fever, and 49 cases of hemorrhagic dengue fever. But in Central America, the gravest health threats, especially for children, are acute respiratory illnesses (including pneumonia) and diarrhea. These have already afflicted thousands of victims.

Although respiratory illness can be treated with antibiotics and diarrheal afflictions can be treated with an oral rehydration solution, it has been difficult


For farmers, researchers, and consumers concerned about the pesticides used on food, the next seven years will be momentous. By August 2006, the EPA's Office of Pesticide Programs (OPP) plans to have taken a second look at every limit that has been set for an amount of residual pesticide that can remain in a food product. That means that the OPP will be reviewing some 9,700 tolerances that have been set for 470 pesticides. The goal of the reviews is to address the key issues raised in the 1996 Food Quality Protection Act (FQPA): Does the pesticide tolerance allow for possible aggregate exposures? Could residues below the tolerable limit be dangerous when combined with exposures to other pesticides? Does the tolerance sufficiently protect children? And what are the effects of the pesticide on the endocrine system? Based on the reviews, the EPA will set new tolerances, and it is likely that some pesticide uses will be banned altogether.




For the many stakeholders that will want to scrutinize the OPP's decisions over the next seven years, the EPA has provided the OPP home page, located on the World Wide Web at http://www.epa.gov/pesticides. For background information on the legislation that is shaping most of the OPP's current work, users can select the FQPA link on the menu bar at the top of the OPP home page. The What's New link on the home page provides a summary of all the recent actions taken by the OPP. Here, people involved in agribusiness can see if the OPP is reviewing a pesticide of concern to them, scientists can access the latest research guidelines proposed by the OPP, and consumers can view the most recent warnings about health effects associated with pesticide consumption. Drafts of OPP decisions are posted here while the office seeks public comment on them. Information on how to submit comments is provided.

To read about past actions taken by the OPP, users can click on the links on the left side of the home page. The Researchers & Scientists link, for example, is connected to the final report outlining how the EPA will determine if a pesticide affects the endocrine system, and a description of how the OPP determines dietary exposure to a pesticide. Links to pesticide databases and information on selected grant programs are also provided here.

Under the Business & Industry link, the EPA provides software that can be downloaded to use the Pesticide Tolerance Index System, a regularly updated list of all the limits set on pesticide residues in food. Also linked to the Business & Industry section is a database containing registration information on 89,000 pesticide products. To view a concise list of the pesticides that have been banned or severely restricted in the United States, users can select the International Activities link on the OPP home page, and then choose the FIFRA Section 17(a) Notification of Exports link. Activities specific to one area of the country can be found on the pesticide pages maintained by each EPA region; these can be accessed by following the Regions, States and Tribes link on the home page.

For people who are less concerned with the details of regulatory decisions and more concerned with how pesticides might affect them, the EPA provides the Concerned Citizens link on the OPP home page. Included under this link is advice on how to control pests safely in your home, information about the possibility of pesticides being present in well water, and a straightforward description of the steps the EPA is taking to protect people from pesticides.

to transport medicines to communities across damaged roads and bridges. "Clean water has been scarce in many areas, and people lack fuel to boil dirty water," says Daniel Epstein, press officer for PAHO. Many parents aren't aware of the danger of severe dehydration, which can kill children quickly, he says. "Chronic dysentery doesn't grab the headlines, but it is responsible for far more loss of life [than other illnesses in the region after the storm]," says Matthew Chico, regional specialist for Latin America and the Caribbean for the American Red Cross. To supply drinking water plants, the agency has already sent 20,000 pounds of purifying chemicals, with another 20,000 pounds on the way and a third shipment of 20,000 pounds planned. The American Red Cross has also distributed chlorine and iodine tablets to purify water.

Mitch caused extraordinary crop losses throughout the region. Nearly 70% of Honduran crops were ruined, according to the U.S. Embassy. Grain fields and the shrimp industry were devastated. The fourth largest banana producer in the world, Honduras lost 90% of its banana crop. In Guatemala, 95% of the nation's banana crop was reported destroyed, plus 25–60% of the corn, bean, coffee, and sugar crops. These effects are especially harmful because so many in Central America rely on farming for jobs. For example, in Honduras, about 54% of the workforce is employed in agriculture.


Luis F. Bueso

**The sound and the fury.** Hurricane Mitch wreaked havoc on the environment and on the lives of people living in its path in Central America.

Extensive logging and burning of forests contributed to massive flooding during Mitch, according to the Rainforest Alliance, an international conservation organization. Central America has lost two-thirds of its forests to logging, agriculture, fires, and development, most of it over the past 30 years. About 75% of the land in Central America is hilly or mountainous. Farmers have routinely planted crops along open slopes, which do not hold the soil as well as wooded areas during heavy rains. In Nicaragua, a tragic incident illustrated a disastrous use of the land. A volcano called *Casita*, or "Little House," was home to subsistence farmers settled there by the government. Farmers had cleared trees to plant crops on the volcano's slope. But after a week of rain during Mitch, one side of the volcano collapsed, burying an estimated 2,000 people in mud. In recent years, farmers and ranchers have purposely set fires, mistakenly believing that burning will improve the soil. To compound the problem, in the first half of 1998 a regionwide drought spread wildfires, burning about 3 million acres.

Mitch overshadowed another tragic natural disaster in the Caribbean this year—Hurricane Georges's rampage across the Dominican Republic, Haiti, Cuba, and other nations in September 1998. Georges crushed important banana plantations, coffee crops, and sugarcane fields. In the Dominican Republic, 150,000 people were displaced by the storm. In Saint Kitts–Nevis, 25% of the homes were destroyed, and 50% of the sugar harvest lost. "Georges caused comparable crop losses to Mitch," says Chico. "The effects of Georges were just as great, particularly in the Dominican Republic. But when Mitch entered the scene, Georges was forgotten."

Despite the devastation in Central America, national governments and the international community are making a concerted effort to clean up the damage and to plan redevelopment. And on the local level "there is a strong community effort," says Ann Stingle, international press officer for the American Red Cross, who visited the region in early November. "People are working to help themselves."

## Federal Food Safety Update

On 8 January 1999, Morris E. Potter was named director of the National Food Safety Initiative. As initiative director, Potter will oversee the food safety activities of the Food and Drug Administration's (FDA) Center for Food Safety and Applied Nutrition, expand and improve the FDA's food-related inspection and surveillance systems, enhance FDA collaborations with other government agencies in responding to foodborne illness outbreaks, institute additional prevention controls and strategies, and conduct nationwide public education campaigns.

Potter most recently served as assistant director for foodborne diseases at the Centers for Disease Control and Prevention (CDC), and acted as CDC liaison to the National Food Safety Initiative. Potter has also served as director of the World Health Organization Collaborating Center for Foodborne Disease Surveillance, and has worked in various veterinary epidemiologist positions in a number of state, federal, and foreign food safety programs, including those of the United States Department of Agriculture and the Illinois Department of Public Health. Potter has served on four National Academy of Sciences panels and on the National Advisory Committee on Microbiological Criteria for Foods.

In support of the National Food Safety Initiative, the FDA recently established a new Web site, located at http://www.foodsafety.gov, that offers information and resources for consumers, food industry workers, and educators. The Reporting Illnesses & Product Complaints link leads consumers to information on whom to contact in the event of various food-related health complaints. The Consumer Advice link accesses information on special topics in food-related health, such as food safety for expectant mothers and senior citizens, and guidelines for handling specific foods such as eggs and seafood. The Industry Assistance link offers a gateway to numerous regulatory Web sites, such as the EPA Office of Pesticide Programs and the CDC's Top 20 Hazardous Substances list. The Kids, Teens, & Educators link brings up educational information geared toward young people, as well as lesson plans and other resources for teachers who want to inform their students about food risks. The Foodborne Pathogens link offers fact sheets on specific illnesses such as listeriosis, and links to government sites with information on various foodborne organisms. Other links on the home page access recent safety alerts, background information on the initiative, and Web sites for other state and federal government agencies.